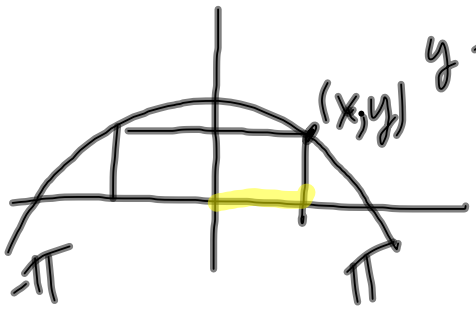
21.



$y = 4\cos(.5x) = h$

$b = 2x$

$A = 2x \cdot 4\cos(.5x)$

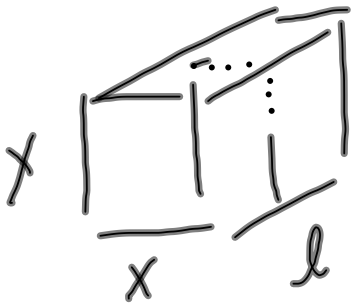
$0 < x < \pi$

$A' =$

A''

Oct 23-11:50 AM

30



max volume

$V = x \cdot x \cdot \ell$

girth + $\ell \leq 108$

$4x + \ell = 108$

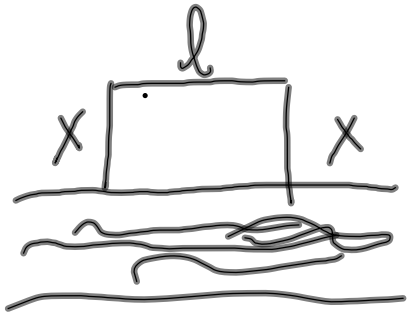
$\ell = 108 - 4x$

$V = x^2(108 - 4x)$

→

Oct 23-11:59 AM

9.



max area

$A = X \cdot l$

$2X + l = 800$

$l = 800 - 2X$

$A = X(800 - 2X)$

$A = 800X - 2X^2$

$A' = 800 - 4X = 0$

$X = 200$

$A'' = -4 < 0$ ⌒

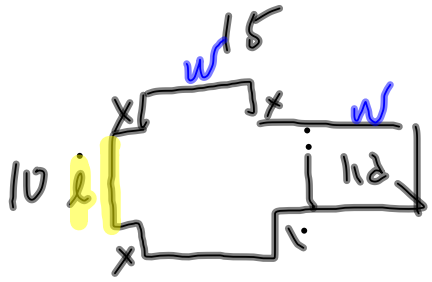
max at $X = 200$

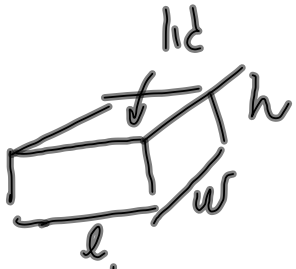
$l = 800 - 2 \cdot 200$

$l = 400$

Oct 23-12:06 PM

18.





max volume

$h = x$

$l = 10 - 2x$

$w = \frac{1}{2}(15 - 2x)$

$2w + 2x = 15$

$V = lwh$

$V = (10 - 2x)\left(\frac{15 - 2x}{2}\right) \cdot x$

$0 < x < 5$

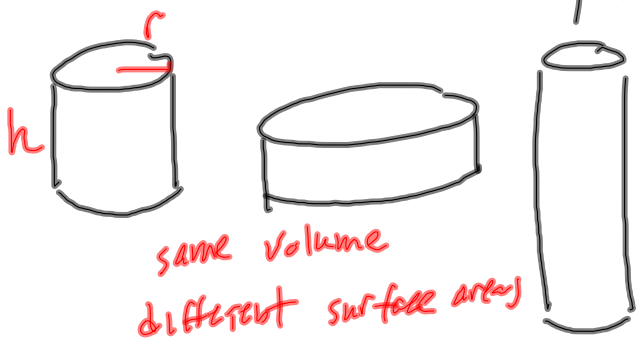
Oct 23-12:12 PM

4.4b more optimization!

hints: diagrams, variables, constants, equation(s), do the calculus, 1st or 2nd derivative test, restricted domain

Oct 23-12:17 PM

Ex 4 can holds 1 liter, least material = SA



same volume

different surface areas

$SA = 2\pi rh + 2\pi r^2$

$V = \pi r^2 h = 1 \text{ liter}$

$\pi r^2 h = 1000\ cm^3$

$h = \frac{1000}{\pi r^2}$

$SA = 2\pi r \frac{1000}{\pi r^2} + 2\pi r^2 = \frac{2000}{r} + 2\pi r^2$

Oct 23-12:20 PM